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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. | | | | | | | | |
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| 10/695,475 | 10/28/2003 | Ying Chen | ARC920030067US1 | 5009 | | | | | | | | |
| 7590 Frederick W. Gibb, III McGinn & Gibb, PLLC Suite 304 2568-A Riva Road Annapolis, MD 21401 | | 09/24/2007 | <table border="1"><tr><td colspan="2">EXAMINER</td></tr><tr><td colspan="2">AHMED, ENAM</td></tr><tr><td>ART UNIT</td><td>PAPER NUMBER</td></tr><tr><td>2112</td><td></td></tr></table> | | EXAMINER | | AHMED, ENAM | | ART UNIT | PAPER NUMBER | 2112 | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/695,475

Applicant(s)

CHEN ET AL.

Examiner

Enam Ahmed

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 6/29/07.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

Non Final Rejection

This office action is in response to Applicants' Amendment of 8 July 2007.

Claims 1, 11 and 19 is amended, claim 27 has been cancelled.

Claims 1-26 remain pending.

The objection to the specification regarding amending paragraph 0005 to replace "RAID-0" with "RAID-1" is still maintained.

The 35 U.S.C. 112 rejections are withdrawn.

Response to Arguments

Applicants' arguments of 7/8/07 have been fully considered and are found persuasive. However the Newly found references Dunn et al. (U.S. Patent No. 6,11,255), Tomita (U.S. Pub. No. 2003/0105921) and Chen et al. (U.S. Patent No. 6,513,093) do teach the amended claims 1, 11 and 19.

Response to Remarks

On page 9, the applicants' have stated that claim 1 has been amended to define "combining an address with a set of retrievable addresses, and further that it is not ambiguous whether the claim language defines "comparing addresses or combining addresses"

The Examiner agrees with the above statement.

On page 9, the applicants' have stated that claim 1 has been amended to define "periodically computing a function of said data to be stored in said disk array to produce a computation; [and] storing said computation". Thus, the Applicants' submit that it is no longer unclear "how the function is being periodically stored" or "what is being stored".

The Examiner agrees with the above statement.

On page 10, the Applicants' have stated that claim 1 has been amended to define "on a disk failure in said disk array, updating said computation using said set of retrievable addresses to recompute only altered portions of said computation". Hence, it

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is no longer unclear "whether it is the recomputing being done on the ECC function or if the function is applied to the data itself.

The Examiner agrees with the above statement.

On page 10, the Applicants argue that one skilled in the art would know that data is obsolete and should no longer be retained. Thus, one skilled in the art would know how to "delete said set of retrievable addressed" as defined by independent claim 1.

The Examiner agrees with the above statement.

On page 10 with respect to claims 11 and 19, the Applicants' have amended claims 11 and 19 to more clearly define the claimed method which is "determining which of said data blocks contain altered redundant data, wherein said itered redundant data comprises at least portion of said redundant data that has been altered subsequent to an immediate previous time said redundant data was stored.

The Examiner agrees with the above statement.

On page 11 with respect to claim 11, the Applicants' have amended claim 11 to more clearly define the claimed method which is "recomputing said altered portions of

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said redundant data to produce recomputed altered portions and storing said recomputed altered portions in said data blocks”.

The Examiner agrees with the above statement.

35 U.S.C. 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-7 are rejected under 35 U.S.C. 102(e) as being unpatentable over Wiencko, Jr. et al. (U.S. Patent No. 6,557,123)

With respect to claim 1, the Wiencko, Jr. et al. reference teaches writing a data block to be stored in a disk array (column 15, lines 47-48); combining an address of said data block with a set of retrievable addresses (column 15, lines 54-55); periodically computing a function of said data block with a set of

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retrievable addresses (column 15, lines 59-60), (see figure 17.2, 1712); storing said computation on at least one spare disk (column 2, lines 10-11); on a disk failure in said disk array, updating said computation using said set of retrievable addresses to recompute only altered portions of said computation (column 23, lines 36-50); deleting said set of retrievable addresses (column 8, lines 61-64).

With respect to claims 2, the Wiencko, Jr. et al. reference teaches wherein said disk failures that are predicted to occur (column 2, lines 51-61).

With respect to claim 3, the Wiencko, Jr. et al. reference teaches wherein said function comprises a mathematical function (column 14, lines 35-39).

With respect to claim 4, the Wiencko, Jr. et al. reference teaches wherein said function comprises an error correcting code (column 7, lines 1-4).

With respect to claim 5, the Wiencko, Jr. et al. reference teaches wherein said address of said data block comprises an address of a corresponding portion of the computed function and said set of retrievable addresses comprises a set of addresses that describe portions of the computed function requiring updating (column 36, lines 24-40).

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With respect to claim 6, the Wiencko, Jr. et al. reference teaches wherein said disk array comprises at least one a RAID array (column 24, lines 16-34).

With respect to claim 7, the Wiencko, Jr. et al. reference teaches comprising reconstructing data stored on a failed disk onto at least one replacement disk (column 2, lines 10-11) and (column 6, lines 64-67).

Claims 11-16 ,18-24 and 26 are rejected under 35 U.S.C. 102(b) as being unpatentable over Dunn et al. (U.S. Patent No. 6,112,255).

With respect to claim 11, the Dunn et al. reference teaches periodically storing redundant data into data blocks located on a spare disk (column 2, lines 30-47); monitoring disks in said disk array for disk failures (column 6, lines 36-41); determining which of said data blocks contain altered redundant data, wherein said altered redundant data comprises at least a portion of said redundant data that has been altered subsequent to an immediate previous time said redundant data was stored (column 6, line 66 – column 7, line 15); recomputing said altered portions of said redundant data to produce recomputed altered portions and storing said recomputed altered portions in said data blocks (column 7, line 50 – column 8, line 32).

With respect to claim 12, the Dunn et al. reference teaches wherein said disk failures that are predicted to occur (column 9, lines 41-44).

With respect to claim 13, the Dunn et al. reference teaches updating said data blocks with altered redundant data when said disk failures have occurred (column 1, lines 30-41 and lines 59-65).

With respect to claim 14, the Dunn et al. reference teaches wherein said disk array comprises at least one a RAID array (column 1, lines 8-13).

With respect to claim 15, the Dunn et al. reference teaches comprising reconstructing data stored on a failed disk onto at least one replacement disk (column 3, lines 7-12).

With respect to claim 16, the Dunn et al. reference teaches wherein the steps of updating and deleting are skipped if said set of retrievable addresses exceeds a fraction of said data stored in said disk array (column 1, lines 30-58)

With respect to claims 18, the Dunn et al. reference teaches wherein the altered portions of said computed function that are less likely to be altered again are preferentially updated (column 2, lines 11-29).

With respect to claim 19, the Dunn et al. reference teaches a monitor operable for monitoring the disks in the array for disk failures to occur (column 6, lines 36-41); a directory operable for determining which of said data blocks contain altered redundant

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data, wherein said altered redundant data comprises at least a portion of said redundant data that has been altered subsequent to an immediate previous time said redundant data was stored (column 6, line 66 – column 7, line 15); (column 8, lines 43-51); a computer operable for updating only portions of said redundant data that has been altered (column 5, lines 36-49).

With respect to claims 20, the Dunn et al. reference teaches wherein said disk failures that are predicted to occur (column 9, lines 41-44).

With respect to claim 21, the Dunn et al. reference teaches a controller operable for updating said redundant data when said disk failures have occurred (column 2, lines 30-39).

With respect to claim 22, the Dunn et al. reference teaches at least one replacement disk operable for storing reconstructed data previously stored on a failed disk (column 3, lines 7-12).

With respect to claim 23, the Dunn et al. reference teaches wherein said directory is operable for marking the recomputed redundant data in said directory (column 9, lines 34-40).

With respect to claims 24, the Dunn et al. reference teaches wherein said disk

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array comprises at least one a RAID array (column 1, lines 8-13).

With respect to claim 26 the Dunn et al. reference teaches wherein the altered portions of said computed function that are less likely to be altered again are preferentially updated (column 2, lines 11-29).

35 U.S.C. 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wiencko, Jr. et al. (U.S. Patent No. 6,557,123) further in view of Minow et al. (U.S. Patent No. 6,021,462).

With respect to claim 8, all of the limitations of claim 1 have been addressed. The Wiencko, Jr. et al. does not teach wherein said steps of updating and deleting are skipped if said set or retrievable addresses exceeds a fraction of said data stored in said disk array. The Minow et al. reference teaches wherein said steps of updating and deleting are skipped if said set or retrievable

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addresses exceeds a fraction of said data stored in said disk array (column 6, lines 34-57) and (column 9, lines 23-34).

Claims 9,17 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wiencko, Jr. et al. (U.S. Patent No. 6,557,123) in view of Sasamoto et al. (U.S. Patent No. 6,442,711).

With respect to claims 9,17 and 25 all of the limitations of claim 12 and 19 have been addressed. The Wiencko, Jr. et al. reference does not teach wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value. The Sasamoto et al. reference teaches wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value (column 1, lines 46-55). Thus it would have been obvious at the time of the invention was made to a person having ordinary skill in the art at the time of the invention was made to have combined the references Wiencko, Jr. et al. and Sasamoto et al. to incorporate wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value. The motivation for wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value is for optimizing performance.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over over Wiencko, Jr. et al. (U.S. Patent No. 6,557,123) in view of Sasamoto et al. (U.S. Patent No. 6,442,711).

With respect to claim 10, all of the limitations of claim 1 have been addressed. The Wiencko, Jr. et al. reference does not teach wherein altered portions of said computed function that are less likely to be altered again are preferentially updated. The Sasamoto et al. reference teaches wherein altered portions of said computed function that are less likely to be altered again are preferentially updated (column 4, lines 33-39) and (column 6, lines 50-60). Thus it would have been obvious at the time of the invention was made to a person having ordinary skill in the art at the time of the invention was made to have combined the references Wiencko, Jr. et al. and Sasamoto et al. to incorporate wherein altered portions of said computed function that are less likely to be altered again are preferentially updated into the claimed invention. The motivation for wherein altered portions of said computed function that are less likely to be altered again are preferentially updated is for optimizing performance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Enam Ahmed whose telephone number is 571-270-1729. The examiner can normally be reached on Mon-Fri from 8:30 A.M. to 5:30 P.M.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques Louis-Jacques, can be reached on 571-272-6962.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EA

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9/14/07

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